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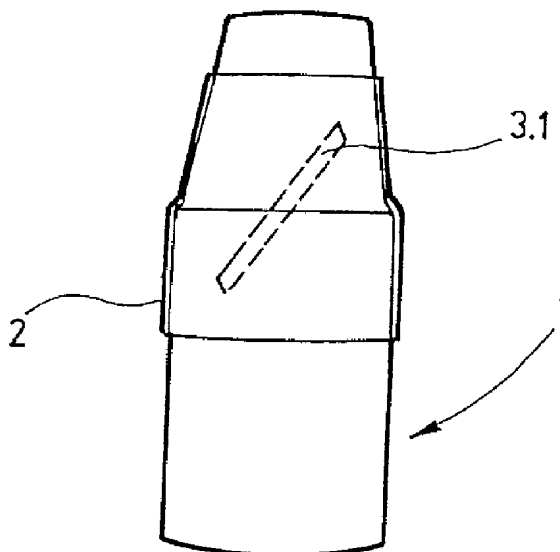
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(54) **DISPOSITIF ET METHODE DE PROTECTION D'ARTICLES CONTRE LE VOL**

(54) **A DEVICE AND A METHOD FOR SAFEGUARDING AN ARTICLE AGAINST THEFT**

(57)

The invention relates to a device and a method for electronic supervision of articles, consisting of a security element which is connected to an article to be safeguarded and which is excited by a magnetic alternating field generated within an inquiry zone to send a characteristic signal by which an alarm is triggered. The objective of the invention is to propose a device and a method which respectively render removal of a security element from an article to be safeguarded considerably difficult. The task is solved by the device in that a protective film is provided which completely covers the security element and the article at least in the area of the security element.

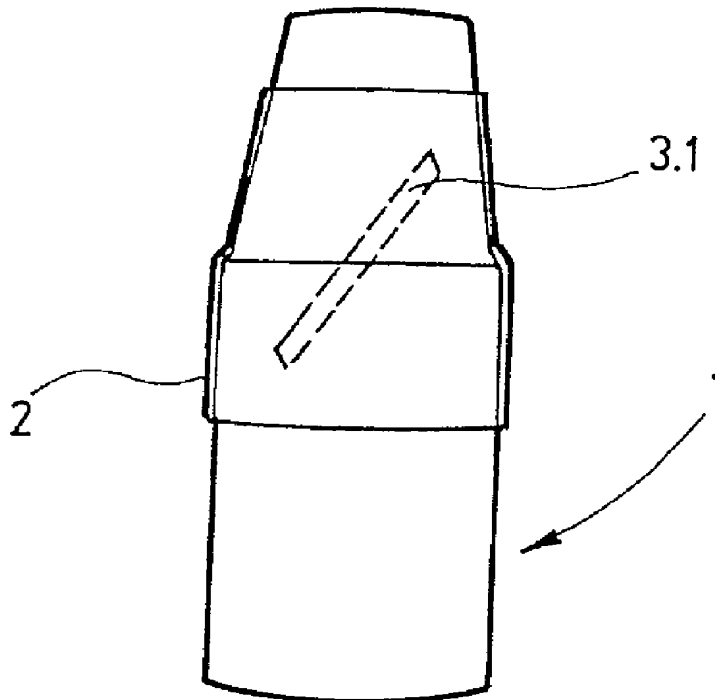




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(54) **Title:** A DEVICE AND A METHOD FOR SAFEGUARDING AN ARTICLE AGAINST THEFT



(57) **Abrégé/Abstract:**

The invention relates to a device and a method for electronic supervision of articles, consisting of a security element which is connected to an article to be safeguarded and which is excited by a magnetic alternating field generated within an inquiry zone to send a characteristic signal by which an alarm is triggered. The objective of the invention is to propose a device and a method which respectively render removal of a security element from an article to be safeguarded considerably difficult. The task is solved by the device in that a protective film is provided which completely covers the security element and the article at least in the area of the security element.



**ABSTRACT**

The invention relates to a device and a method for electronic supervision of articles, consisting of a security element which is connected to an article to be safeguarded and which is excited by a magnetic alternating field generated within an inquiry zone to send a characteristic signal by which an alarm is triggered. The objective of the invention is to propose a device and a method which respectively render removal of a security element from an article to be safeguarded considerably difficult. The task is solved by the device in that a protective film is provided which completely covers the security element and the article at least in the area of the security element.

A device and a method for safeguarding an article against theft

The invention relates to a device and a method for electronic safeguarding of an article against theft.

Various security elements have already been published for electronic safeguarding of articles against theft. One particularly advantageous design of a security element in the form of a thin film label is described in EP 0 295 028 B1. Thin film labels consist of a thin layer of soft magnetic material, preferably within the  $\mu\text{m}$  range. The soft magnetic layer is preferably placed on a carrier substrate by a physical process of depositing under vacuum conditions.

Besides thin film labels, so-called "strip" security elements are used especially for safeguarding articles in the foodstuffs sector. Such elements consist of a strip of soft magnetic material or a soft magnetic wire.

Oscillating resonance circuits are also used as security elements for safeguarding articles. Such security elements are, for example, described in detail in EP 285 559 B1. EP 0 093 281 B1 describes security elements which are excited by mechanical oscillations when an alternating magnetic field is applied and which generate a detectable signal.

Furthermore, so-called 'intelligent' transponders are described in EP 0 494 114 A2, which in addition to safeguarding articles of merchandise to which they are fixed, also enable unequivocal identification of the articles concerned. The same patent specification also describes the design of a suitable detection system.

A large number of different methods have already been published for detection of security elements in an inquiry zone. For instance, EP 123 586 B proposes, in addition to two inquiry fields with frequencies  $f_1$  and  $f_2$  in the kHz range, the sending of one field with a frequency within the Hz range into the inquiry zone. The two inquiry fields having  $f_1$  and  $f_2$  frequencies excite a security element situated in the inquiry zone to send a characteristic signal having intermodulation frequencies  $n.f_1 \pm m.f_2$  ( $n, m = 0, 1, 2, \dots$ ). The low-band inquiry field causes the security element in this field frequency to be driven from saturation in one direction to saturation in the other direction. The characteristic signal therefore takes place periodically at the frequency of the low-band field.

As an alternative solution, use of only one inquiry field within the kHz range for excitation of the security element has also been published, in which the characteristic signal of the security element again takes place at the frequency a low-band field which drives the soft magnetic material backwards and forwards between the two saturations.

For detection by security elements with oscillating resonance circuits, a narrow band alternating field which excites the security element to send a characteristic signal in its resonance frequency range is radiated into the inquiry zone.

The object of the present invention is to propose a device and a method which respectively render removal of a security element from the article to be safeguarded considerably difficult.

With regard to the device, this task is solved in that a protective film is provided which completely covers the security element and the article, at least in the area of the security element.

In accordance with beneficial further developments of the device according to the present invention, the security element consists either of a strip or a thin film made from soft magnetic material or of an oscillating resonance circuit having capacitance  $C$ , resistance  $R$  and inductivity  $L$ , or of a magnetomechanical security element which is excited into mechanical oscillations by a magnetic alternating field.

By way of protective film, it has proved to be extremely advantageous to use a film which contracts with changes of temperature (shrink film). Such films are well known and serve i.a. to protect an article from damage. They are also widely used in cases where it is necessary to protect products against unauthorized opening, thus ensuring, especially for packages containing valuable

products, that no exchange or mixing of the original product can take place.

In accordance with the present invention, the protective films also fulfil the additional function of connecting the article to be safeguarded to the security element and preventing any manipulation of the security element in a simple but nevertheless extremely effective way.

The version in which the film takes the form of a tube which is drawn over the article and the security element can be regarded as particularly advantageous. An alternative to the tubular-shaped protective film is a sheet formation which is wrapped round the article and the security element. The film is either heated after wrapping round the article or it is wrapped around the article in an already heated state. When the film cools it shrinks and adjusts optimally to the shape of the article to be safeguarded.

It can be regarded as especially advantageous if the protective film is a laminate, in which the security elements are embedded and preferably arranged in zones lying parallel to each other. The size of the protective film can easily be adjusted to the article to be safeguarded by subdividing it in appropriate laminate segments.

With regard to the method, the task is solved in that a protective film is connected to the article to be safeguarded at least in the area of one security element

in such a way that the said protective film can only be removed from the article by destruction.

According to a first possibility, the security element is connected to the article, e.g. laid or glued onto the article; the protective film is then wrapped round the article at least in the area of the security element or drawn over the article.

As an alternative version of the method according to the present invention, it is proposed that the security element is connected to the protective film; the protective film is then wrapped round the article or drawn over the article so that in this case also the security element is situated between the article and the protective film. In this example it is particularly beneficial if the protective film together with the integrated security elements is manufactured as a laminate with the security elements arranged parallel to each other; the laminate is then cut to the necessary size according to the article to be safeguarded.

A third advantageous further development of the method according to the present invention proposes the security element as an integral component of the protective film.

In this way, placing the security element and the protective film on the article is rendered considerably easier, since handling of separate parts is no longer necessary.

The invention is explained more closely on the basis of the following figures, which show:



Figure 1: a diagram of a version of the device according to the invention.

Figure 2a: a top view of a strip security element.

Figure 2b: a top view of a thin film security element.

Figure 2c: an exploded view of a security element with an oscillating resonance circuit.

Figure 3a: a top view of a protective film.

Figure 3b: a perspective view of a tubular protective film, and

Figure 4: a perspective view of an advantageous further development of the device according to the invention.

Figure 1 gives a diagram of a version of the device according to the invention. The security element 3 - in the version represented the security element is a strip 3.1 made from soft magnetic material - is rigidly fixed between the article 1 and the protective film 2.

In Figure 2a the strip security element 3.1 is shown separately. Figures 2b and 2c show a thin film label 3.2 and a label 3.3 with an oscillating resonance circuit. As shown in the exploded view in Figure 2c, the security element 3.3 with oscillating resonance circuit consists of a spiral conductor element 4 ( $\rightarrow$  inductivity  $L$  and resistance  $R$  and a capacitor 5 ( $\rightarrow$

capacitance C), in which the two capacitor boards 5 are distanced from each other by a dielectric layer 6.

Figure 3a shows a top view of a sheet formation of protective film 2 which is wrapped round an article 1, such that the security element 3 is fixed between the article 1 and the protective film 2. An especially beneficial design of the protective film 2 in tubular form is illustrated in Figure 3b.

Figure 4 shows a perspective view of an advantageous further development of the device according to the invention. In this version, the protective film 2 inclusive of the security elements 3.1 takes the form of a laminate 7. The security elements 3.1 are arranged in areas lying parallel to each other. According to the size of the article to be safeguarded, the laminate 7 is divided into areas B of differing size.

List of Reference Numbers

- 1 Article
- 2 Protective Film
- 3.1 Strip Security Element
- 3.2 Thin Film Security Element
- 3.3 Security Element with Oscillating Resonance Circuit
- 4 Spiral Conductor Element
- 5 Capacitor Board
- 6 Dielectric Layer
- 7 Laminate
  
- B Area
- C Capacitance
- L Inductivity
- R Resistance

**CLAIMS:**

1. A device for electronic supervision of an article, comprising at least one security element which is connected to an article to be safeguarded and which is excited by a magnetic alternating field generated within an inquiry zone to send a characteristic signal by which an alarm is triggered, and  
a protective film which completely covers the article, at least in the area of the security element,  
the security element being in the form of a strip made from a soft magnetic material,  
the security element being an integral part of the protective film,  
the protective film being a laminate comprising a plurality of layers with the security element sandwiched between two adjacent layers of the laminate, and  
the protective film being a tube which is either drawn over the article or made from a sheet of protective film wrapped and fixed around the article.
2. A device in accordance with claim 1, wherein the security element is a thin film made from a soft magnetic material.
3. A device in accordance with claim 1 or 2, wherein the protective film is a heat-shrink film which contracts with application of heat.
4. A device in accordance with claim 3, wherein said at least one security element comprises a plurality of security elements each sandwiched between two adjacent layers of the laminate and arranged in areas lying parallel to each other.
5. A method of electronic supervision of an article, in which at least one security element is used which is connected to an article to be safeguarded and in which the security element is

excited by a magnetic alternating field generated inside an inquiry zone to send a characteristic signal which triggers an alarm, wherein

a protective film is connected, at least in the area of said at least one security element, to the article to be safeguarded in such a way that the said protective film can be detached by destruction of said article,

the security element is formed as an integral part of the protective film which is a laminate comprising a plurality of layers with the security element sandwiched between two adjacent layers of the laminate, and the protective film is then wrapped and fixed around or drawn over the article to form a tube around the article.

6. A method in accordance with claim 5, wherein said at least one security element comprises a plurality of security elements arranged parallel to each other and in which the laminate is cut to the necessary size according to the article to be safeguarded.

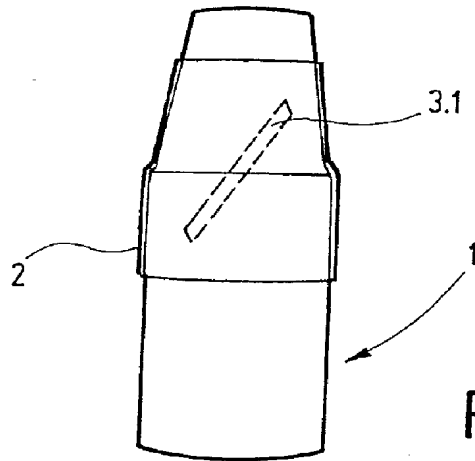


Fig. 1

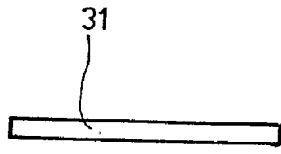


Fig. 2a

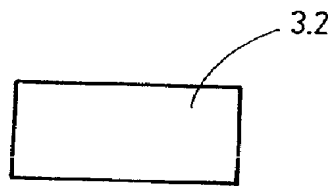


Fig. 2b

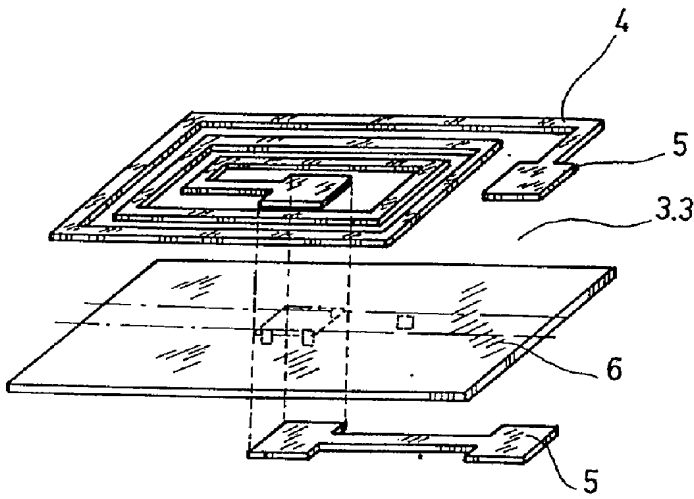


Fig. 2c



Fig. 3b



Fig. 3a

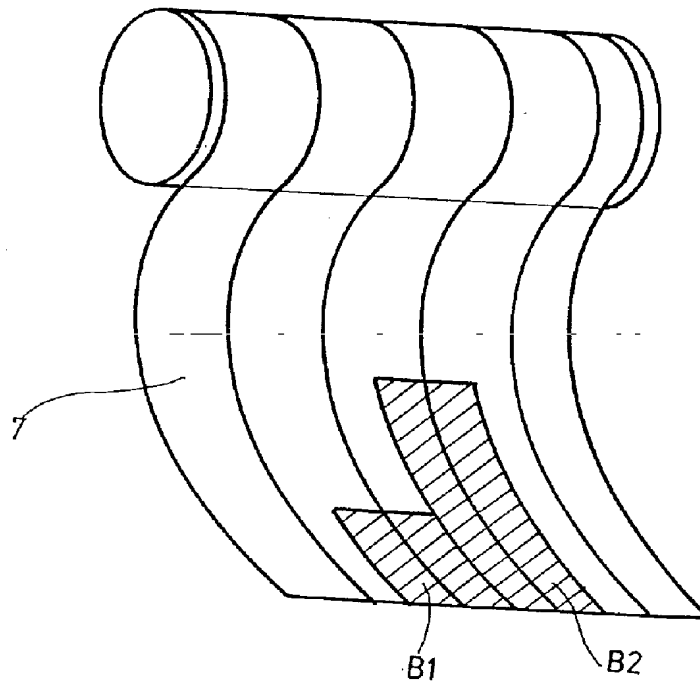


Fig. 4